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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/071,664	02/08/2002	Hiroshi Nemoto	791_056 DIV	4184

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EXAMINER
ALEJANDRO, RAYMOND

ART UNIT	PAPER NUMBER
1745	

DATE MAILED: 08/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/071,664	NEMOTO ET AL.	
	Examiner	Art Unit	
	Raymond Alejandro	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the c rrespondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 August 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 11-27* is/are pending in the application.

4a) Of the above claim(s) *14,16 and 19-27* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,11-13,15,17 and 18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. *09/348530* .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *1* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of General Species 1 and Additional Species A (claims 1, 11-13, 15 and 17-18) in Paper No. 5 is acknowledged. The traversal is on the ground(s) that "all species...could be examined in a single application without imposing an undue burden". This is not found persuasive because it is noted that as admitted by the applicant and disclosed in the specification, the instant application includes lithium transition metal compounds comprising several distinct substitution elements. Thus, the disclosure encompasses a variety of different and separated lithium oxide compounds being *mutually exclusive*. Accordingly, serious burden would be raised if the search of both different methods was made as required for the separate and distinct inventions.

The requirement is still deemed proper and is therefore made **FINAL**.

Priority

2. Applicant's claim for domestic priority under 35 U.S.C. 120 is acknowledged.

Information Disclosure Statement

3. The information disclosure statement (IDS) submitted on 02/08/02 was considered by the examiner.

Specification

4. The substitute specification filed 03/13/02 has been entered.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 11 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. Claim 11 is indefinite as the molar amounts "X_1" and "X_2" do not satisfy the specific molar amount relationship as set forth in claim 1, that is, the molar amounts "X_1" and "X_2" do not meet the mathematical equation $X_1 + X_2 = 1$ as claimed in claimed 1 and presented in Tables 1-5 (See EMBODIMENTS per se). Thus, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Further clarification is required.

Double Patenting

8. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

9. Claims 1, 12-13, 15 and 17-18 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-3, 5 and 7-8 of U.S. Patent No. 6368750. Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following reasons:

The US patent'750 claims the following (CLAIMS 1-3, 5 and 7-8):

1. A lithium secondary battery comprising a positive active material including a lithium transition metal compound, said compound being represented by the formula $Li(Ni_{x1}Ti_{x2})_zMn_{2-z}O_4$ wherein z is 0.01 to 0.5 , x1=0.5, x2=0.5, and said positive active material has a spinel configuration of the cubic system.

2. A lithium secondary battery according to claim **1**, wherein said lithium transition metal compound further comprises Li as an additional element.

3. A lithium secondary battery according to claim **1**, wherein said lithium transition metal compound further comprises Mg as an additional element.

5. The lithium secondary battery of claim **1**, wherein the average ionic radius of the substitution members is within ≠15 percent of the ionic radius of Mn.

7. The lithium secondary battery according to claim **1**, wherein the lithium transition metal compound is composed by firing a mixed compound comprising salts and/or oxides having been prepared with a predetermined ratio in the presence of oxygen within a temperature range of 600° C. and 1000° C. for 5 hours to 50 hours.

8. The lithium secondary battery according to claim **7**, wherein the lithium transition metal compound has been synthesized and obtained by conducting at least first and second firing steps, with the firing temperature of the second step being higher than that of the first step.

In this case, the instant application claims are broader or more generic than the patent claims, thus, the instant application claims are anticipated by the patent claims. Accordingly, a

broad range is anticipated by a narrow range which lies within the broad limitation. *In re Goodman.*

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

11. Claims 1, 11-13, 15 and 17-18 are rejected under 35 U.S.C. 102(e) as being anticipated by Manev et al 6040089.

The instant claims are directed to a lithium secondary battery wherein the claimed inventive concept comprises the specific lithium transition metal compound. Other limitations include the additional elements; the average ionic radius; and the firing and synthesizing steps.

Regarding claim 1 and 11:

Manev et al disclose a multiple-doped oxide cathode material as follows (ABSTRACT):

[57] **ABSTRACT**

The present invention provides a positive electrode material for lithium and lithium-ion secondary cells which exhibits good cycleability, reversible specific capacity, and structural stability. The positive electrode material comprises a lithium multi metal oxide having a spinel structure and described by the general formula:

$$Li_{1+X}Mn_{2-Y}M_{m_1}^{1}M_{m_2}^{2}\ldots M_{m_k}^{k}O_{4\pm Z}$$

wherein M^1, M^2, . . . M^k are at least two cations different than lithium or manganese, selected from the group consisting of alkaline earth metals, transition metals, B, Al, Si, Ga and Ge;

X, Y, m_1,m_2, . . . m_k are numbers between 0 and 0.2;

m_1, m_2 and Y are greater than 0;

Z is a number between −0.1 and 0.2; and

wherein the metals M^1, M^2, . . . M^k and the corresponding values m_1, m_2, . . . m_k satisfy the following equation and inequality:

$$Y = X + m_1 + m_2 + \cdots + m_k$$

Manev et al also disclose that the lithium metal oxide can include various codopant combinations, for example, combinations of nickel, titanium and magnesium, among other elements (COL 4, lines 39-45):

> Although the codopant combination of cobalt and titanium is described as a preferred embodiment for use in the invention, various other combinations can be used in accordance with the invention. For example, combinations of aluminum, cobalt, chromium, copper, iron, gallium, magnesium, nickel, germanium, molybdenum, niobium, titanium, vanadium and tungsten such as aluminum/

and in particular, nickel/titanium (COL 4, lines 45-47): nickel/titanium,

Manev et al disclose that although the codopant combination of Co and Ti is described as preferred embodiment for use, combinations including nickel/titanium can be used (COL 4, lines 39-46). In that, Manev et al also disclose that in a particularly preferred embodiment the lithium

metal oxide spinel compound is codoped with Co^{3+} and Ti^{4+} to form the spinel material; and preferably, in order for the dopants to achieve an specific valency, the molar amounts of Co^{3+} and Ti^{4+} are equivalent (COL 4, lines 27-37). In addition, specific **EXAMPLES 1-2** shows the molar amount $z = 0$, and $M_1 = M_2 = 0.01$. *Thus, Manev et al clearly envisage using equivalent molar amounts of the codoping (substitution) elements, and their teaching is fully applicable to the other various combinations including nickel/titanium. Therefore, Manev et al do satisfy anticipation requirements as specific examples in the prior art which are within the claimed range anticipate the range as well as prior art which teaches a range within, overlapping or touching the claimed range anticipates the range provided that prior art range discloses the claimed range with sufficient specificity.* (***See MPEP 2131.03 Anticipation of Ranges***).

Regarding claim 12:

It is disclosed that M is cation selected from the group consisting of alkaline earth metals (COL 3, lines 45-48), particularly, Manev et al teach that a codopant element can be magnesium (COL 4, line 39-44); wherein magnesium can be used to produce multiple doped lithium manganese oxide spinels which meet the disclosed formula (COL 4, lines 60-62).

Regarding claim 13:

Manev et al disclose that, in addition, a portion of manganese can also be replaced by excess lithium (COL 4, lines 31-35).

Regarding claim 15:

It is taught that the codopants typically have a mean ionic radii size (R_i) which corresponds to the mean ionic radii size of the manganese ions being replaced (COL 4, line 65 to COL 5, line 2).

Regarding claims 17-18:

As to the method limitations, i.e. the firing and the synthesizing steps, it is noted that a method limitation incorporated into a product claim does not patentable distinguish the product because what is given patentably consideration is the product itself and not the manner in which the product was made. Therefore, the patentability of a product is independent of how it was made. *However, Manev et al disclose the following* (COL 6, lines 45-63):

> The mixture once prepared can be reacted by a solid state reaction to form the multiple-doped lithium manganese oxide spinel compounds of the invention. Preferably, the mixture is reacted by firing the mixture at an elevated temperature between about 400° C. and about 900° C. in the presence of oxygen, e.g., in an atmosphere with a partial pressure of oxygen of at least 20 kPa. The mixture can be fired in one step but is preferably fired in more than one step to produce the spinel compound. Preferably, the mixture is fired at a temperature between about 400° C. and about 500° C. for 1 to 24 hours, at a temperature between about 500° C. and about 600° C. for 1 to 24 hours, and at a temperature of between about 700° C. and about 900° C. for 1 to 24 hours. Additional firing steps can also be used in the invention to improve the quality of the resulting spinel as described, e.g., in U.S. Pat. No. 5,718,877, which is hereby incorporated in its entirety by reference. Once the mixture has been fired to form the multiple-doped lithium manganese oxide spinel compound, this compound is preferably cooled to ambient

Thus, the claims are anticipated.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (703) 306-3326. The examiner can normally be reached on Monday-Thursday (8:30 am - 7:00 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (703) 308-2383. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Raymond Alejandro
Examiner
Art Unit 1745